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THE PROGRESS OF SCIENCE

SUBSTITUTES FOR WAR

THIS war, beyond measure disastrous to civilization, is a trial also of our democracy. We may hope that it is an old-world war and an old-men's war, repugnant to the genius of our newer life. The statements of some of our public men and the contents of some of our newspapers can not be read without discouragement. But it is also true that there has perhaps not appeared a cartoon in any American newspaper tending to glorify war, and no legislation has so far been enacted in preparation for war. There is good reason to believe that the people have not been infected by the contagion of blood.

As Professor Patrick argued in a recent issue of the *Monthly*, man is by genetic inheritance a fighting and a playing animal, not an animal delighting in steady work. The ape and the tiger will be exterminated elsewhere in nature before they will be suppressed in man. It is a slow process, but surely proceeding.

The writer of this note has determined the proportion of each century in which the leading nations have been engaged in war. The curve thus found has no great reliability, for it does not take into account the percentages of the peoples concerned, but its course clearly indicates that even under circumstances as they have been, wars will come to an end. And there is good reason to believe that the newer condition—universal education and universal suffrage, democratic control, improved economic conditions of living for the people, the scientific attitude—will tend to bend the curve more rapidly toward the base line of permanent "peace on earth and good will to men."

While man has inherited instincts which exhibit themselves in playing and fighting, the same instincts may by

social control be diverted to playing the games of art or science, to fighting disease and vice. It is rarely wise or feasible to attempt to suppress instincts; they should be directed so as to provide desirable conduct. Loyalty to family, to group, to neighborhood and to nation can not be lightly cast away for an abstract cosmopolitanism. But it can be expressed otherwise than by seizing everything in sight by cunning or by violence.

William James, the great psychologist, in one of his brilliant essays published in *The Popular Science Monthly* for October, 1910, tells us that history is a bath of blood; we inherit the war-like type; our ancestors have bred pugnacity into our bone and marrow; showing the irrationality and horror of war does not prevent it; but a moral equivalent can be found by enlisting an army to toil and suffer pain in doing the hard and routine work of the world. It is doubtful, however, if the "gilded youths" to whom James refers would accept "dish-washing, clothes-washing and window-washing, road-building and tunnel-making, foundries and stoke-holes," as a substitute for war, and for the great mass of the people there is more than enough of these things. It is to escape from them that we seek excitement and adventure, intoxication by drugs and war.

Professor Cannon, of Harvard University, proposes international football and other athletic contests as substitutes for war. The adrenal glands, whose secretions excite the combative and martial emotions, must function, and their activity, he argues, can be directed in this way. Mr. Bryan has just now made the proposal that we build six great national roads by which armies might be collected for defence; the secretary of the navy has founded a

Naval Inventions Board; the postmaster general has suggested that aeroplanes be used to deliver mail in order that we may have an aerial corps ready for service. There may be an element of the absurd in some of these proposals, as there would be in using submarines to catch cod fish, so that there might be practise in building and managing such crafts for peaceful pursuits. There is, however, psychological justification for aiming to direct the emotions so that their discharge is not destructive, but of benefit to the nation and to the world. Such would be the development of our national resources, the construction of railways, roads, waterworks and the like; social and political reforms; progress in the care of public health, in education and in scientific research. It is proposed that the next congress should spend half a billion dollars on the army and navy. It is possible that on a plebiscite vote, exactly under existing conditions, a majority would vote to make the department of war a department of public works, military defence being only one of its functions, and to spend the sum proposed on public works useful in case of war, but not an incitement to war.

NATIONAL WEALTH AND PUBLIC INDEBTEDNESS

WHILE the lives and the wealth of the European nations are being sacrificed on a scale hitherto unparalleled, it is well in the interests of those nations, as well as of our own, that we conserve the lives and wealth of our own people. The greatest wealth of a nation is its children, its productive workers, its scientific men and other leaders, its accumulated knowledge and social traditions. These are immeasurable, but the Bureau of the Census has recently prepared a report on the material wealth and indebtedness, according to which it is estimated that the total value of all classes of property in the United States, exclusive of Alaska and the insular possessions, in 1912, was \$187,739,000,000,

or \$1,965 per capita. This estimate is presented merely as the best approximation which can be made from the data available and as being fairly comparable with that published eight years ago. The increase between 1904 and 1912 was 75 per cent., for the total amount and 49 per cent. for the per capita. Real estate and improvements, including public property, alone constituted \$110,677,000,000, or 59 per cent. of the total, in 1912. The next greatest item, \$16,149,000,000, was contributed by the railroads; and the third, \$14,694,000,000, represented the value of manufactured products, other than clothing and personal adornments, furniture, vehicles and kindred property.

The net public indebtedness in 1913 amounted to \$4,850,461,000. This amount was made up as follows: National debt, \$1,028,564,000, or \$10.59 per capita; state debt, \$345,942,000, or \$3.57 per capita; county debt, \$371,528,000, or \$4.33 per capita; and municipal debt, \$2,884,883,000, or \$54.27 per capita. Thus the average urban citizen's share of the net federal, state, county and municipal debt combined was \$72.76; and the average rural citizen's share of the net federal, state and county debt combined was \$18.49.

The total federal debt in 1910 was \$2,916,205,000, of which amount \$967,366,000 was represented by bonds, \$375,682,000 by non-interest-bearing debt (principally United States notes or "greenbacks"), and \$1,573,157,000 by certificates and notes issued on deposits of coin and bullion. Against this indebtedness there was in the treasury \$1,887,641,000 in cash available for payment of debt, leaving the net national indebtedness at \$1,028,564,000, or \$10.59 per capita. The increase in the net indebtedness between 1902 and 1913 amounted to 6 per cent., but for the per capita figure there was a decrease of 13 per cent. The burden due to the national debt is thus very light in comparison with that imposed by the indebtedness of other great nations.